

## REMARKS

Claims 47-58 are pending in the present application and at issue.

It is respectfully submitted that the present amendment presents no new issues or new matter and places this case in condition for allowance. Reconsideration of the application in view of the above amendments and the following remarks is requested.

The Office maintained the rejection of claims 47-58 under 35 U.S.C. 103 as being unpatentable over Allen (U.S. Patent No. 5,389,369) taken with Winkler et al. (U.S. Patent No. 5,928,380) and Cantor et al. (U.S. Patent No. 3,539,520). This rejection is respectfully traversed.

Allen discloses methods and compositions for killing or inhibiting the growth of yeast or sporular microorganisms comprising contacting the microorganisms, with a haloperoxidase, a peroxide, a halide source and at least one antimicrobial activity enhancing agent. Suitable antimicrobial activity enhancing agents are certain alpha-amino acids, which are not salts of  $\text{NH}_4^+$ .

Winkler et al. disclose a method of treating undyed fabric, garment or yarn in an aqueous medium with a composition comprising an effective amount of a haloperoxidase, a halide source and a hydrogen peroxide source. The treated fabric is said to have improved shrink-resistance. Winkler et al. further disclose that the composition may comprise a buffer to maintain a suitable pH for the haloperoxidase used (column 5, lines 47-50). Winkler et al. further disclose a laundry list of buffers, one of which is ammonium carbonate. However, Winkler et al. do not contain any working examples of the combination of haloperoxidase and ammonium carbonate. Moreover, Winkler et al. do not teach or suggest the use of haloperoxidases for killing or inhibiting the growth of microorganisms. Moreover, buffers are not typically used in methods of killing or inhibiting the growth of microorganisms.

Cantor et al. disclose detergent sanitizing compositions containing germicidal quaternary ammonium germicides in combination with a limited class of block polymer nonionic detergents (col. 2, lines 40-50). All of the germicidal compounds are quaternary ammonium compounds which contain four alkyl and/or aryl groups. However, Cantor et al. do not teach or suggest the use of salts of  $\text{NH}_4^+$ , i.e., a nitrogen atom attached to four hydrogen atoms. Moreover, since salts of  $\text{NH}_4^+$  are not germicidal compounds, it is improper to combine Cantor et al. with the other references.

Thus, none of the cited references, alone or in combination, teaches or suggests methods and compositions for killing or inhibiting the growth of microorganisms using a haloperoxidase and a salt of  $\text{NH}_4^+$ , as claimed herein. Moreover, none of the cited references, alone or in

combination, teaches or suggests the preferred halide sources and ammonium salts recited in the dependent claims.

Moreover, none of the cited references suggest that the combination of a haloperoxidase and a salt of  $\text{NH}_4^+$  would result in an increased antibacterial activity. These results are surprising and unexpected.

In response, the Office stated the following:

Also applicant alleges that the references fail to suggest that the combination of a haloperoxidase and a salt of  $\text{NH}_4^+$  would result in an increased antibacterial activity. However, the touted surprising and unexpected results pertain to Example 4 and not to Table 1, at page of the Specification, for example, wherein the effects of KI and  $\text{INH}_4$  are not significantly different at 0.5 mM concentration. In Example 4 a specific haloperoxidase is used in conjunction with ethanol amine.

This is respectfully traversed.

In Example 3, Applicants have measured the antibacterial activity of a *Curvularia verruculosa* haloperoxidase using various ammonium halides. Specifically, approximately  $10^6$  cfu/ml of cells were incubated with the enzyme and salt for 15 minutes at 40°C. The results are provided in Table 1. Because the results are presented in log cfu/ml, the highest possible bactericidal activity is about 6. Thus, at a concentration of 0.25 and 0.5 mM, the use of  $\text{NH}_4\text{I}$  and  $\text{NH}_4\text{Cl}$  resulted in a total kill of cells, and at a concentration of 8 mM, the use of  $\text{NH}_4\text{Br}$  resulted in a total kill of cells. Even at the lower concentration of 4 mM, the use of  $\text{NH}_4\text{Br}$  resulted in a significant bactericidal activity. The results show that all of the ammonium salts tested and at all concentrations, a significant bactericidal activity was obtained. Thus, the statement in the Office Action that “the touted invention is dependent on the specific ammonium salt used, as well as its concentration and does not produce the touted unexpected results throughout the broad ranges as claim designated” is not supported by the specification.

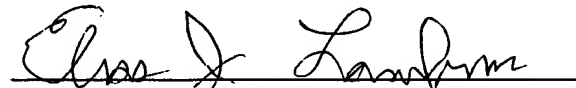
Moreover, the formula of ethanolamine is  $\text{CH}_2\text{OHCH}_2\text{NH}_2$ . Thus, ethanolamine is not a salt of  $\text{NH}_4^+$ .

For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 103. Applicants respectfully request reconsideration and withdrawal of the rejection.

In view of the above, it is respectfully submitted that all claims are in condition for allowance. Early action to that end is respectfully requested. The Examiner is hereby invited to contact the undersigned by telephone if there are any questions concerning this amendment or application.

Respectfully submitted,

Date: February 25, 2004

A handwritten signature in cursive script, appearing to read "Elias J. Lambiris", written over a horizontal line.

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